

A Comparison of Sand Pine Varieties in Central Florida

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ABSTRACT. In a comparison planting of the Ocala (*P. clausa* var. *clausa* Ward) and the Choctawhatchee (*P. clausa* var. *immuginata* Ward) varieties of sand pine in central Florida, the natural range of Ocala, survival was equal 10 years after establishment. The severe competition that occurred on the site after planting significantly reduced the growth rate of the Choctawhatchee trees, but the Ocala trees grew at their normal rate. Based on the interim results of this study, Ocala is the preferred variety for use on sandhills sites in central Florida.

The sandhills, deep alluvial and marine deposits of sand, occupy a significant area of land in the Southeastern Coastal Plain. Once covered with relatively open stands of longleaf pine (*Pinus palustris* Mill.), past use and abuse has left most areas—except in the citrus belt and the Ocala National Forest in central Florida—dominated by scrub oaks and wiregrass. Considerable effort has been expended to find a species which could be used to reforest these sites. Only native longleaf and sand pine (*P. clausa*) have been found suitable for such droughty, infertile areas. Although longleaf will reach merchantable size on sandhills sites, it is relatively difficult to establish and its growth is comparatively slow. Therefore, sand pine is the best choice for these sandhills sites (Brendemuehl 1981).

There are two recognized varieties of sand pine. Ocala sand pine, the closed-cone variety, is native to central Florida while Choctawhatchee, the open-cone variety, is native to northwestern Florida. Comparisons in a number of the earlier species trials have shown that the Choctawhatchee variety is superior to Ocala on sandhills sites in northwest Florida, Georgia, and South Carolina (Burns 1973, Hebb and Burns 1973). Although Choctawhatchee has slower initial growth, by age 10 or 15 years average tree size of both varieties is essentially equal. Because Choctawhatchee typically averages 10 to 40 percent greater survival, it produces more wood than the Ocala. In addition, Choctawhatchee is less susceptible to mortality from mushroom root rot.

Because few comparison plantings have been made on sites within the natural range of the Ocala variety, it is not clear which variety is best for the

central highlands region of Florida. Reported here are the 10-year results from a study established to help answer this question.

METHODS

The study is located on the Ocala National Forest in Marion County, Florida, on a portion of a recently cut Ocala sand pine stand that had failed to regenerate. The site was chopped in December 1970 with a medium weight (8¼ ton) double-drum brush cutter to reduce competing vegetation, which consisted primarily of evergreen oaks, holly, and palmetto. Choctawhatchee seed was collected from natural stands in Washington County, and Ocala seed came from the Ocala National Forest. All seedlings were grown at the Chipola Experimental Forest nursery. The 1-0 seedlings were hand planted at a 6-by 10-foot spacing in February 1971.

Twelve plots, 75 by 100 feet of each variety, were planted in a paired plot arrangement. An interior plot of 50 by 50 feet was established in each for measurement of trees. All measurement plots contained five rows of trees, but because of variation in within-row spacing caused by debris on the site the total number of trees varied from 36 to 42.

RESULTS

The Choctawhatchee variety had higher survival than the Ocala five months after planting but it has suffered greater mortality losses since then (Table 1). By age 10 years both varieties had essentially equal survival. The Ocala variety trees have grown at a faster rate since establishment, and by age 10 averaged about 7 feet taller than the Choctawhatchee (Table 1). Although the difference in growth rate has diminished, at age 10 the Ocala were still growing about ½ foot more per year than the Choctawhatchee trees. Trees of the Ocala variety have made faster diameter growth as well. Ten years after planting they were

Table 1. Survival and height of Ocala (OSP) and Choctawhatchee sand pine (CSP) planted on the Ocala National Forest.¹

Age	Survival		Height	
	OSP	CSP	OSP	CSP
 Percent.....	 Feet.....	
5 months	69a	81b	—	—
1 year	67a	75b	1.2a	0.7b
2.5 years	67a	74b	4.5a	3.2b
7 years	67a	73b	18.3a	12.5b
10 years	64a	66a	27.5a	20.2b

¹ Means within a row not followed by the same letter are significantly different at the .05 level.

more than an inch larger in average d.b.h. (Table 2). Because of the faster growth rate and equivalent survival, the Ocala plots have produced more than twice as much wood as the Choctawhatchee plantings.

DISCUSSION

Although the Choctawhatchee variety had better initial survival than the Ocala—which it typically does (Burns 1973)—unlike comparative plantings in northwest Florida, it has not maintained this advantage. The amount of competing vegetation is greater on this Ocala site than it normally is on sandhills sites within the natural range of Choctawhatchee. Observations indicated that competing vegetation was a major factor in mortality of Choctawhatchee seedlings. The slower early growth of Choctawhatchee apparently resulted in greater subsequent mortality because they were not as successful as the Ocala in outgrowing the competition. Still, both varieties had equal and acceptable stand densities 10 years after planting with most of the remaining trees above the competing vegetation.

On the basis of height growth the Ocala variety seems better adapted to compete with the proliferation of sprouts which occurred on the site following seedling establishment. The Ocala trees

Table 2. Diameter and volume of Ocala and Choctawhatchee sand pine 10 years after planting on a central Florida site.

Variety	Average diameter	Volume ¹
 Inches.....	Ft ³ /acre
Ocala	4.1a ²	685a
Choctawhatchee	2.9b	315b

¹ Volumes are for the entire bole based on equation by Rockwood et al. (1980).

² Values within a column not followed by the same letter are significantly different at the .01 level.

have grown at a rate comparable to those for test plantings in northwest Florida (Burns 1973) but the Choctawhatchee trees have not. Their growth rate is more comparable to the slower rates characteristic of Choctawhatchee when it is underplanted among scrub oaks. More thorough site preparation might reduce the competition sufficiently so that growth of the Choctawhatchee variety would not be retarded. Rockwood and Kok (1978) reported better survival and more normal height growth through age 5 for Choctawhatchee sand pine planted on sites with more thorough site preparation. The Ocala variety however, was still taller and, since it apparently does not require better site preparation, there would be little justification for the added expense.

The best criteria for comparison is the volume of wood produced per unit of area. On this basis, after 10 years the Ocala variety is far superior to the Choctawhatchee. Thus, considering that central Florida is its natural range and the interim results of this study, Ocala is the recommended variety of sand pine for use on sandhills in the central highlands.

Users of this information should be cautious about trying to plant Ocala sand pine. Recommendations on seedling care and planting (Balmer et al., 1974) should be followed closely. Establishment by direct seedling is a viable alternative. This method has been used extensively with good success on the Ocala National Forest (Price 1973).

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